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APPLIATUS FOR EMPTYING PACKAGES OR RECEPTACLES HAVING FLEXIBLE WALLS

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Fig. 1

Fig. 2
The present invention has for its object an improvement in methods and apparatus for emptying packages or receptacles having flexible walls, containing viscous liquids or pasty materials, according to which the emptying is obtained by crushing the package by means of an air pressure developed inside a resistant enclosure in which the said package has been previously enclosed.

However, the emptying obtained by this method, although satisfactory, is not complete owing to the fact that the air-seal between the package and the enclosure is never perfect and that the package such as has hitherto been devised is not rationally crushed, that is to say without leaving pockets. Thus with the package made of strong paper, having the shape known by the name of Wallis wedge, a perfect emptying cannot be obtained under the present conditions.

The improvement made in this method by the present invention, overcomes these drawbacks. It consists essentially in interposing between the package and the wall of the enclosure under pressure, a pocket or bag, preferably made of rubber, forming with the said wall an enclosed space, in which air is introduced under pressure so that the crushing of the packaging is effected through the instrumentality of a bag made of rubber or the like.

The upper edge of the bag is used to form directly a joint which ensures the air-tightness of the space between said bag and the wall of the enclosure under pressure.

Said edge can be plain or can consist of a toric keeper.

A further and important feature of the invention is the shape and thickness of the rubber bag. The bag will preferably have in its various parts a variable thickness depending on the proximity of the corresponding parts of the package, those which correspond to zones of the package intended to be crushed first having less thickness than those corresponding to parts intended to be crushed last.

Thus in an embodiment which is more particularly adapted for the emptying of packages having the shape of a Wallis wedge, the invention can advantageously have one or a plurality of the following characteristics:

a. Opposite the large faces of the "wedge", the thickness of the bag walls increases away from the edge upwardly so that in operation the angle closes progressively from the edge.

b. Opposite the rounded portions connecting the large faces of the "wedge" the thickness of the bag is very much less than that of the side walls above-mentioned so that the flattening at the edge of the large faces is satisfactorily effected, and such thickness can also increase from the edge upwardly.

c. At the upper part of the large faces, for a distance from the seal at the base, the thickness very substantially decreases so that such part can be considerable elongated to pass around the small arms of the V which will finally be formed by the flattened package.

The lower part of the bag both in the rounded portions and on the large faces, can be reinforced to avoid its deterioration by the metal clip which closes the edge of the package.

In spite of this and in particular in the case of the package in the shape of a Wallis wedge, which is the most usually employed, and for very thick grease, it may occur that the package is crushed at the side in the bulged zone at least resistance comprised between the bottom and the two plain walls which end at the angle of the "wedge", before the said walls have come into contact with each other over their entire surface, so that a certain quantity of grease is cut off from all access towards the outlet and remains imprisoned.

To overcome this drawback the elastic pocket or bag is advantageously constituted so as to be undeformable over a certain height from its open base, or it will be made undeformable in this region by an appropriate reinforcement such as a metal ring arranged against its inner face or embedded in its mass when it is moulded.

By means of this arrangement the parts of the rubber bag and of the package adjacent this rigid zone, instead of prematurely moving against the bottom of the package are folded back vertically about said zone, this modification being accompanied, during the whole time it takes place, by a considerable tension in the wall of the bulged part of least resistance whereby the package cannot become prematurely "throttled" in this region to cut off the path of the grease coming from the "edge" of the Wallis wedge.

In an advantageous embodiment, the rigid ring is provided with an annular base which is used to fix the edge of the rubber bag on the casing.

The accompanying drawings show by way of example two embodiments of the apparatus which is the object of the invention, in the case of its application to a packing in the shape of a Wallis wedge.

Fig. 1 is a vertical section perpendicular to
the large face of the Wallis wedge of a first embodiment.

Fig. 2 is a horizontal section along 2—2 Fig. 1. Fig. 3 is a vertical section through the bisecting plane of the wedge.

Fig. 4 is a detail section of a modification of the edge of the rubber bag.

Fig. 5 is a vertical section of a second embodiment ready to operate for emptying.

Fig. 6 is another vertical section of this device, assumed to be turned upside down, during the emptying operation.

As can be seen in Fig. 1, the package to be emptied 10 which in this example has the shape of a Wallis wedge is lodged in a resistant enclosure 11 formed by a box of the same shape and a lid 12. The top of the box 11 is mounted in a part 13 which has a bearing face for the edge 14a of a rubber bag 14 interposed between the box 11 and the package 10. Said edge 14a is held by a joint cover washer 15 clamped by screws 16, thereby making the pressure chamber P between the box and the bag perfectly air tight. The part 13 carries a compressed air inlet connection 17 and a duct 18 passes therethrough which places said connection in communication with the chamber P.

On the other hand the circular edge 10a of the package 10 is clamped between the washer 15 and the lid 12 thereby giving a sufficient air tightness with respect to the lubricant or other viscous material contained in the package.

The lid 12 which is hinged on a pin 19 carried by the lug 20 of the part 13 is clamped for example by means of wing nuts 21 permanently mounted on screwed rods 22 which swing on pins 23 also carried by the part 13, said rods being adapted to engage in slots of the lid, in known manner.

The rubber bag 14 could of course be of uniform thickness, but to obtain best results, according to the principle of the invention, the thickness is varied according to the proximity of the corresponding parts of the packing.

Referring to Figs. 1 to 3, it will be seen that opposite the large faces the thickness increases from the bottom edge upwardly (from A to B, Fig. 1) and that in the rounded parts which connect said large faces to each other the thickness is much less, while it increases from the bottom upwardly (from C to D, Fig. 2). Owing to this fact, when air under pressure is blown into the chamber P the flattening of the package under the action of the rubber bag, which is pushed in by the air, takes place strictly from the bottom upwardly perpendicularly to the large faces, closing the angle of the wedge progressively from the top and as easily at the edge of said large faces as in the middle, owing to the greater elasticity of the parts E, Fig. 2.

On the other hand from B and D, to the upper edge 14a the thickness both on the large faces and on the rounded portions decreases, whereby these smaller parts F can become considerably elongated to take up the contour of the small arms of the T which is formed by the flattened package (see the portion in chain dotted lines in Fig. 1). Finally, owing to the presence of the metal closure 27 of the "wedge", the lower part G of the bag will be advantageously reinforced for a long service.

Instead of the plane edge 14a the rubber bag could have at the edge of its upper opening a toric keeper 14b, Fig. 4. In this case the clamping between the lid and the box would effect at the same time the clamping of said keeper and of the rolled edge of the packing.

In Figs. 2 to 3, 5 and 6, 30 designates the metal casing, 31 its lid or its fixing flange, 32 the package of the lubricant. The bottom 34 of said package is closely applied against the flat part of the flange 31 and its opening 35 communicates with the pipe 36 which conveys the grease to the cylinder of the compressor, not shown.

The rubber bag 37 of which the thickness varies so that the crushing of the package takes place by moving together the plain faces of the Wallis wedge from the edge towards the flat base, is in this case provided at its base with a metal band or ring 38 adapted to make it undeformable at this point. In this example said circle is arranged inside the bag which is fixed to the casing, 35 for example by clamping between the edge of the said casing and an annular edge 38a on the circle 38 by means of screws 39.

The supply of compressed air to the casing is effected by any appropriate means, for example 30 by a nozzle 40 which is introduced, when said casing is placed in position with the enclosed packing, in a joint 41 provided at the orifice of the supply pipe 42. The two parts of the emptying system are sealed in order to avoid leakage of grease by the sole clamping of the beading 34 of the package between two conical parts of the flange 31 and the of the rigid circle 38—38a.

The operation is as follows:

When compressed air is first sent into the space between the casing and the rubber bag the crushing of the package through the intermediary of said bag begins to take place from the closure 43 by the moving together of the two plain faces of the Wallis wedge at the same time the zone 45 (Fig. 5) of the rubber bag which is adjacent the rigid circle 38 is pressed on the packing, then together with the zone adjacent the latter, bends back gradually inwardly about the said circle (Fig. 6). This bending back is necessarily accompanied by the production of a considerable tension in the bulged zone of least resistance of the wall of the package, which tension opposes the production of any unwanted throttling of the packing in this region. Thus the flattening of the package in the direction of the arrows f can continue to take place progressively from the edge towards the base without leaving any inclosed grease.

The portion in chain dotted lines 33 indicates the final shape of the package, and 37 the elastic bag.

It is obvious that the stiffening circle could be otherwise arranged and for example be embedded in the rubber during moulding.

On the other hand the invention is not limited to the embodiments described and illustrated but it includes all the modifications which might be necessitated by its applications, or other shapes of packages. Finally the rubber bag could be replaced by a more ample bag made of any flexible hermetic material.

What I claim is:

1. Apparatus for discharging viscous liquids or pasty materials comprising a package containing
the material, said package having flexible side walls and a flat end wall, a casing accommodating the package with lateral play, and a bag of flexible material interposed between the package and the casing, means for putting the interior of the casing and exterior of the bag under fluid pressure, so that the pressure crushes the package through the intermediary of said bag.

2. Apparatus for discharging viscous liquids or pasty materials comprising a package containing the material, said package having flexible side walls and a flat end wall, a casing accommodating the package, with lateral play, a bag of flexible and extensible material interposed between the package and the casing, means for subjecting the interior of said casing and exterior of said bag to fluid pressure to crush the package through the intermediary of said bag.

3. Apparatus for emptying packages of viscous liquids or pasty materials comprising, a package having flexible side walls and a flat end wall for containing said material, a casing for accommodating the package with lateral play, said package provided with an outlet opening, the flat wall of said package having an opening communicating with the opening in the casing, a bag made of flexible and extensible material interposed between the package and the casing, means for ensuring air-tightness between the bag and the casing, and means for ensuring air-tightness between the bag and the package, and a connection fixed on the casing for supplying a compressed fluid to said casing between its wall and that of the bag.

4. Apparatus for emptying packages of viscous liquids or pasty materials comprising a package containing said material having flexible side walls and a flat end wall, a casing for accommodating the package with lateral play, said package having a flexible peripheral edge around its flat end wall, a lid provided with an outlet opening for the casing, the end wall of the package having an opening communicating with said outlet opening of the casing, a bag made of flexible and extensible material interposed between the package and the casing, said bag being provided with an edge around its entrance, an annular clamping element for clamping said edge on the top of the cylindrical package between said annular element and the lid of the casing, and a connection fixed on the casing for supplying a compressed fluid to said casing between its inner surface and the outer surface of the bag.

5. Apparatus for emptying packages having flexible side walls and flat end walls and containing viscous liquids or pasty materials comprising a casing for accommodating the package with side play, a flat bottomed and flexible wall package enclosed in said casing, means for placing said casing under pressure of a compressed fluid, a bag made of flexible and extensible material interposed between the package and the casing, said bag having in its various parts a variable thickness in accordance with the desired order of crushing the parts of the package the parts of the bag corresponding to the parts of the package desired to be crushed first having less thickness than those corresponding to the parts of the package desired to be crushed last.

6. Apparatus for emptying packages having flexible side walls containing viscous liquids or pasty materials which comprises, a package in the shape of a Wallis wedge having side walls of flexible material and a flat end, a casing accommodating said package with lateral play, means for supplying fluid pressure within the casing, a bag made of flexible and extensible material interposed between the package and the casing, said bag having, opposite the large oblique faces of the Wallis wedge, increasing thickness from the point towards the flat end.

7. Apparatus for emptying packages having flexible side walls containing viscous liquids or pasty materials which comprises, a package having flexible side walls and a flat end and having the shape of a Wallis wedge, a casing for accommodating said package with lateral play, a bag having, opposite large oblique faces of the Wallis wedge, a thickness which increases from the point towards the flat end, said bag being made of flexible and extensible material and being interposed between the package and the casing, said bag having an undeformable portion extending a part of its length from its base.

8. Apparatus for emptying packages of viscous liquids or pasty materials which comprises, a package in the form of a Wallis wedge having flexible side walls and a flat base, a casing accommodating said package with lateral side play, means for placing said casing under fluid pressure, a bag made of flexible and extensible material interposed between the package and the casing, said bag having a flat and flexible wall packing, and being in the shape of a Wallis wedge, said bag being undeformable for a portion of its height from its base.

9. Apparatus for emptying packages containing viscous liquids or pasty materials which comprises, a package having flexible side walls and a rigid flat end and in the form of a Wallis wedge, a casing for accommodating the package with lateral play, means for placing the interior of said casing under fluid pressure, a bag made of flexible and extensible material interposed between the package and the casing, and a rigid ring disposed inside said bag at the base of the latter, to make said bag undeformable in the portion thereof adjacent said base.

10. Apparatus for emptying packages containing viscous liquids or pasty materials which comprises, a package having flexible side walls and a rigid flat base and in the form of a Wallis wedge, a casing for accommodating the package with lateral play, means for placing the said casing under fluid pressure, a bag made of flexible and extensible material interposed between the package and the casing, said bag having in its various parts a variable thickness according to the desired sequence of progressive crushing of the parts of the package, the parts of the bag corresponding to the parts of the package desired to be crushed first having less thickness than those which correspond to the parts of the package desired to be crushed last, and a rigid ring disposed inside said bag at the base of the latter, to make said bag undeformable in the portion adjacent its base.

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